

## AMENDMENTS TO THE CLAIMS

1 - 77. (canceled)

78. (Currently Amended) A device for desynchronizing treating neuronal brain activity pathologies involving the neurons of a large a neuron population firing in a synchronized manner at a pathological frequency, the device comprising:

a plurality of electrodes configured to stimulate a plurality of adapted-for-stimulating and implanted in respective neuron subpopulations, respectively, of the large neuron population, wherein each electrode of the plurality of electrodes is configured to generate a burst of electrical pulses to reset the respective neuron subpopulation; and

a control unit configured to control the plurality of electrodes to generate the respective bursts of electrical pulses in sequence having a predetermined time shift between each of the bursts in the sequence means connected to the electrodes for generating and feed therethrough to the respective neuron subpopulations stimulation signals each comprised of a burst of pulses having a respective predetermined frequency capable of resetting the firing of the neurons of the respective subpopulation and with the burst fed to each subpopulation time shifted of the bursts fed to the other subpopulations such that each respective neuron subpopulation is reset at a different point in time and fires out of phase with the other subpopulations,

wherein the predetermined time shift is substantially equal to  $1/fN$ , and

wherein  $f$  is approximately the pathological frequency and  $N$  is the number of the plurality of electrodes.

79. (Currently Amended) The device as claimed defined in claim 78 wherein each burst includes 1 to 20 pulses.

80. (Currently Amended) The device as claimed defined in claim 78 wherein the bursts are periodically administered by the respective electrodes.

81. (Currently Amended) The device as claimed defined in claim 78 wherein the bursts all have the same time duration.

82. (Currently Amended) The device as claimed defined in claim 78 wherein the bursts are identical.

83. (Currently Amended) The device as claimed defined in claim 78 wherein there are at least three such electrodes and the time offsets between the bursts of the electrodes are identical.

84. (Currently Amended) A method of desynchronizing treating neuronal brain activity pathologies in which a large involving a neuron population firing of brain neurons fire in a synchronized manner at a pathological frequency, the method comprising the steps of:

providing a plurality of implanting electrodes for stimulating a plurality of neuron in respective subpopulations, respectively, of [[a large]] the neuron population; to be desynchronized; and

controlling the plurality of electrodes to each generate stimulating each of the subpopulations of the large population via the respective electrode with a respective stimulation signal each comprised of a burst of electrical pulses such that each burst is provided to having a respective predetermined frequency capable of resetting the firing of the neurons of the respective neuron subpopulation in a sequential order having a predetermined time shift between each of the bursts in the sequence in order to with the burst fed to each subpopulation time shifted to the bursts fed to the other subpopulations such that the burst reset the respective neuron neurons of each subpopulation at a different point in time to fire out of phase with the neurons of the other subpopulations; and

predetermining the time shift to substantially equal  $1/fN$ ,

wherein f is approximately the pathological frequency and N is the number of the plurality of electrodes.

85. (Currently Amended) The method as claimed defined in claim [[78]] 84, wherein the controlling step further comprises generating each burst includes 1 to 20 pulses for each burst of electrical pulses.

86. (Currently Amended) The method as claimed defined in claim [[78]] 84, wherein the bursts are periodically administered by the respective electrodes.

87. (Currently Amended) The method as claimed defined in claim [[78]] 84, wherein the controlling step further comprises generating the bursts to have all have the same time duration.

88. (Currently Amended) The method as claimed defined in claim [[78]] 84, wherein the bursts are identical.

88. (Canceled)

89. (Currently Amended) The method as claimed defined in claim [[78]] 84, further comprising positioning the plurality of wherein the electrodes substantially are arrayed symmetrically with respect to one another.

90. (Currently Amended) The device as claimed method defined in claim [[84]] 96, wherein the plurality of electrodes are implanted substantially symmetrically with respect to one another.

91. (Currently Amended) A device for desynchronizing treating neuronal brain activity pathologies involving the neurons of a large a neuron population firing in a synchronized manner at a pathological frequency, the device comprising:

a plurality of electrodes configured to stimulate a plurality of adapted for stimulating respective neuron subpopulations, respectively, of the large neuron population, wherein each electrode of the plurality of electrodes is configured to generate a burst of electrical pulses to reset the respective neuron subpopulation; and

a control unit configured to control the plurality of electrodes such that respective pairs of electrodes simultaneously generate the bursts of electrical pulses in sequence having a predetermined time shift with respect to the bursts generated from the other pairs of electrodes in the sequence -means connected to the electrodes for generating and feeding therethrough to the respective neuron subpopulations stimulation signals each comprised of a burst of pulses having a respective predetermined frequency capable of resetting the firing of the neurons of the respective subpopulation and with the burst fed to each subpopulation time shifted of the bursts fed to the other subpopulations such that each respective pair of neuron subpopulations are subpopulation-is reset at a different point in time and fire [[fires]] out of phase with the other subpopulations and each of the pair of ~~for simultaneously outputting from two of the electrodes generates identical~~ bursts of pulses having but with opposite polarities,

wherein the predetermined time shift is based on the pathological frequency.

92. (Currently Amended) A method of desynchronizing ~~treating~~ neuronal brain activity pathologies in which a large involving a neuron population firing of brain neurons fire in a synchronized manner at a pathological frequency, the method comprising the steps of:

providing a plurality of electrodes for stimulating a plurality of neuron subpopulations, respectively, of the neuron population;

predetermining a time shift based on the pathological frequency

controlling the plurality of electrodes such that respective pairs of electrodes simultaneously generate stimulating each of a plurality of subpopulations of the large population with a respective stimulation signal each comprised of a burst of electrical pulses such that each pair of electrodes generates the respective bursts for having a respective predetermined frequency capable of resetting the firing of the neurons of the respective neuron subpopulations subpopulation in a sequential order having the predetermined time shift with respect to the bursts generated from the other pairs of electrodes in the sequence in order to with the burst fed to each subpopulation time shifted to the bursts fed to the other subpopulations such that the burst reset the respective neuron subpopulations

~~neurons of each subpopulation~~ at a different point in time to fire out of phase with the neurons of the other subpopulations; and

~~for each pair of electrodes, simultaneously outputting from the two of the electrodes of the pair~~ identical bursts of pulses ~~having but with~~ opposite polarities.

93-94. (Canceled)

95. (New) The method as claimed in claim 84, further comprising providing at least three such electrodes and identically offsetting the time shift between the bursts of the electrodes.

96. (New) The device as claimed in claim 78, wherein at least one of the plurality of electrodes is further configured to be implanted in the plurality of neuron subpopulations, respectively.

97. (New) The method as claimed in claim 84, further comprising implanting at least one of the plurality of electrodes in the respective neuron subpopulation.

98. (New) The device as claimed in claim 78, wherein each of the plurality of electrodes is further configured to generate the electrical pulses at a time  $t - \tau$ , wherein  $t$  is the respective time within the sequence of electrical pulses of the respective electrode and  $\tau$  is the conduction time between the respective electrode and its respective neuron subpopulation.

99. (New) The method as claimed in claim 84, further comprising generating the electrical pulses at a time  $t - \tau$ , wherein  $t$  is the respective time within the sequence of electrical pulses of the respective electrode and  $\tau$  is the conduction time between the respective electrode and its respective neuron subpopulation.